Spaceports: Portals to the Universe

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Abstract

A review of online learning resources for children, parents, and teachers reveals instructions and learning tools for wide range of topics including rockets, spacecraft, satellites, planets, solar systems; spacesuits, among others. Yet, no resources were found on the topic of spaceports (spaceport infrastructure, operations, management, "business of space") needed to support the safe and efficient integration, launch, and return of vehicles, crew, and payloads. Surveys, experiments, and secondary data analysis were then used to identify topic interests for an educational curriculum to be developed on spaceports for a targeted segment of the population. Results gathered help to create materials, lesson plans, and knowledge for a "ready to go" curriculum that can be provided to a summer camp environment or in a classroom setting. Completion of this investigation will allow children to have a better understanding of the relationship between spaceports and the community, and demonstrate that space is for everyone, with many work opportunities outside those traditionally noted in research (astronaut, scientist, engineer).

Objective

The effort is to build an educational curriculum targeted to children, teachers, and families on spaceports and the necessary infrastructure to support the safe integration, launch, and return of various vehicles, crew, and payloads, with an overarching theme that space is place for everyone with many career opportunities.

Methodology

- Thorough review of all available materials regarding spaceports and their infrastructure, as well as the analysis and identification of age-appropriate lessons and activities to support the curriculum
- Research excursion to tour the facilities at Cape Canaveral, observe a rocket launch and build foundational knowledge on spaceports to further enhance our research and abilities to develop a comprehensive and educational curriculum
- Conducted a "test launch" of the curriculum with two students
- Survey, experiment, and secondary data analysis were used to identify and establish a base for interest in the topics covered for an educational curriculum.
- Verbal survey was conducted to gauge the involvement and interest of the students after the "test launch".
- Surveys were also given to the parents of the selected students, two Volusia County Public Schools (VCPS) representatives in attendance, and one retired teacher (remote attendance).

Key Findings

- "Test launch" revealed the age and subject matter appropriateness of lessons and activities
- Children and adults had a limited knowledge of spaceports, necessary infrastructure and community involvement in the operations of spaceports
- Activities should be led in as small groups as possible for better contact and engagement and the answering of questions
- Classroom or camp settings should bring out Lego sets and supplemental learning materials in phases to avoid over stimulation
- The final survey at the conclusion of the "test launch" revealed that the students were able to identify pilots, firefighters and nurses as essential personnel in the spaceport community
- The students most enjoyed the crafts, Lego building and rocket launch activities

Limitations

We have experienced COVID-19 related impacts regarding delivery and execution of the curriculum. Depending on the format of the camp (i.e., virtual or in-person) we will need to reevaluate the effectiveness of activities considering available resources and student engagement.

References (Abridged)

Tinoco, J., Yu, C., Howard, D., Stilwell, R. (2020). Introduction to Spaceports: Runways to Space, Milton Park, Abingdon, Oxon: Routledge

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